SILVICULTURE...

Growing forests for our children's children

BRITISH COLUMBIA

Ministry of Forests and Range

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INTRODUCTION

Silviculture is the art and science of establishing and tending forests to meet specific management objectives, such as timber production, biodiversity, wildlife habitat, or visual quality. It involves a number of carefully planned activities designed to modify or alter the forest.

Forest managers use silviculture as a tool to maintain or create a wide range of forest conditions, from early shrub and herb communities to mature forests with old-growth characteristics. Each forest condition contains different ecological features capable of satisfying a variety of management goals.

SILVICULTURE ACTIVITIES

Silviculture activities are generally carried out within the framework of a silvicultural system. A silvicultural system is a planned cycle of operations by which a forest or group of trees is harvested, regenerated, and tended over time.

The silvicultural systems used in British Columbia are clear-cutting, seed tree, shelterwood, selection, and retention. Each name reflects the type of forest structure remaining after the initial harvest.

Partial retention system with wildlife tree reserves.

Silviculture activities include:

Harvesting

Harvesting removes the forest cover from an area to varying degrees, depending on the silvicultural system being used. Conventional clearcutting removes all the trees, while partial cutting systems (seed tree, shelterwood, selection, and clear-cutting with reserves) leave residual trees behind. Harvesting provides timber for employment, community stability, and government revenue. Harvesting also initiates the process of-regeneration and the changes in plant communities that enhance biodiversity and wildlife habitat. Partial cutting can help preserve scenic values and maintain water quality.

Shelterwood system with 30 per cent residual trees.

Site Preparation

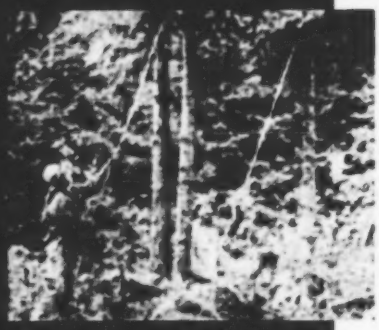
Preparing a harvested area for planting or natural regeneration through ground scarification, disc trenching, mounding, or burning provides seedlings with more suitable sites on which to grow. Site preparation techniques, such as burning, can also mimic natural disturbance processes and help establish naturally occurring plant communities to provide biodiversity and wildlife habitat.

Planting

Planting after harvesting can establish a new forest sooner than relying on natural regeneration. It also allows for the use of genetically improved tree seedlings and a broader mix of plant species, including hardwoods, herbs, and shrubs. Planting is also used for stream bank and slope stabilization, and for site restoration.

Planting after harvesting can help establish a new forest sooner.

Brushing removes competing vegetation.



Pruning promotes the production of high quality, clear (knot-free) wood.

Vegetation Management

Brushing removes competing vegetation from the immediate vicinity of young trees, freeing up nutrients, water, and sunlight to increase survival and growth.

Spacing

Spacing removes selected trees from a young stand to reduce competition for light, water, and nutrients. It promotes faster growth, larger trees, and uniform size and shape which can reduce harvesting and milling costs. The openings in the canopy created by spacing allow sunlight to reach the forest floor, encouraging understorey growth for biodiversity and wildlife habitat. Spacing can also help produce healthier stands by removing diseased and damaged trees, and by reducing tree density.

Pruning

Pruning involves the removal of live or dead branches from the stems of trees. It promotes the production of high quality, clear (knot-free) wood. Pruning also opens up the understorey for other plant species to grow, enhancing biodiversity and wildlife habitat. The pruned branches of some tree species can be used in floral arrangements or distilled to produce botanical forest products such as essential oils.

Commercial Thinning

Commercial thinning is similar to spacing except that it is carried out in older immature stands where the trees have reached merchantable size. It provides a source of interim timber harvesting and promotes rapid growth for the well-spaced remaining trees. Commercial thinning can allow for limited timber extraction in visually sensitive areas while maintaining scenic values. Like spacing, commercial thinning also encourages biodiversity and wildlife habitat, and promotes forest health.

Fertilization

Fertilizers are used to promote tree growth on sites deficient in one or more nutrients. It can help increase the rate of growth and produce larger trees. Fertilization also encourages understorey growth for biodiversity and wildlife habitat.

Once a regenerated forest reaches a mature harvestable age, the cycle can begin again with harvesting.

USING SILVICULTURE TO MIMIC NATURAL FOREST LANDSCAPES

Natural forest landscapes are a diverse mix of forest types and conditions, plant communities, wildlife habitat, riparian areas, and other features. This diversity is created and maintained largely through the dynamic nature of forest ecosystems.

Forests don't stay the same for long. They are constantly changing—living, growing, dying, and regenerating on a continual basis. This natural process occurs relatively slowly in forests that remain undisturbed for long periods of time, but can be quite sudden and dramatic in forests susceptible to frequent natural disturbances such as fire, insects, disease, wind, or landslides.

Undisturbed Forests

The pace of change in undisturbed forest ecosystems is relatively slow, brought about gradually by the death and decay of aged trees.

Naturally Disturbed Forest

Fire can significantly impact a forest. Some plants and animals survive the disturbance, while others quickly move in to colonize the area. As the new ecosystem develops, it passes through several successional stages where certain species dominate until it reaches a relatively stable climax community or is disturbed again.

By mimicking certain aspects of natural disturbances, forest managers can attain many of the characteristics of natural forest landscapes in managed forests.

Managed Forest

As with naturally disturbed areas, clearcuts are quickly colonized by pioneer shrubs, herbs, and deciduous trees. The retained trees provide some older forest characteristics for biodiversity and wildlife habitat. Over time, the clearcut passes through several successional stages until mature trees once again dominate.

Diversity is created and maintained largely through the dynamic nature of forest ecosystems.

Some plants and animals survive a natural disturbance while others quickly move in to colonize the area.

Forests are valued for much more than timber production and the economic benefits of wood and paper products.

ACHIEVING MULTIPLE OBJECTIVES ACROSS THE LANDSCAPE

Forests are valued for much more than timber production and the economic benefits of wood and paper products. They also provide habitat for plants and animals, clean air and water, scenic and spiritual values, and recreational opportunities.

Balancing the requirements for a variety of forest resources and values on the same land base is challenging. It requires a comprehensive, long-term approach to forest management – one that not only considers the timing and location of silviculture activities, but which also links the various forest conditions together across the landscape.

For example, in the case of wildlife habitat, we must ensure that the landscape as a whole can meet the seasonal requirements of wildlife for feeding, reproduction, cover, and dispersal. This requires providing enough suitable habitat in the right locations, and linking the various habitat types together with relatively undisturbed forest/wildlife corridors. Furthermore, the landscape must continue to meet wildlife habitat needs as individual stands mature and develop. This is where silviculture can be used to alter the characteristics of the forest cover to satisfy wildlife habitat requirements.

DESIGNING FUTURE FORESTS

Designing future forests capable of satisfying a wide range of management objectives requires long-term, landscape- and forest-level planning. In British Columbia each forest or management unit has its own unique silviculture strategy or plan.

Planning at the landscape level begins with a detailed assessment of a forest's natural resources and land-use capabilities. From this assessment, broad management strategies and objectives can be established based on what the land can or cannot physically provide.

All forests contain certain areas that are more productive than others. Some sites may be rich in resource values, while others may be limited by various natural constraints. For this reason, no forest can be managed for all things at every location.

Nevertheless, various management objectives can be managed for at different locations across a landscape. Forest managers must first evaluate the natural attributes of different sites within the forest. Once these have been identified, achievable site-specific objectives can be set depending on the resources available at each site.

Silviculture can then be used to create the forest conditions required to meet the desired management objectives. The result is a diverse pattern of resource values across the landscape, similar to a natural forest.

Using silviculture to create various forest conditions results in a diverse array of objectives designed to meet specific needs of our communities, wildlife habitat, and the environment.

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